[Specification]

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Title of the Invention: Brown rice Germination Method

[Abstract]

Provided is a brown rice germination method capable of effectively germinating brown rice having various nutrients and a large amount of dietary fiber in an undecayed state to increase the nutrients and activate the brown rice, diluting residual agricultural chemicals using natural purification of plant germination, and enabling convenient cooking of the brown rice, like white rice, with a smooth and sweet flavor. All the nutrients of the brown rice can be activated by germination thereof, protein can be increased by about three times, and vitamins B1, B2, B6, and B12 can be greatly increased. In addition, it is possible to select and consume brown rice germinated to various levels according to a person's physical constitution, thereby promoting popularization of brown rice appropriate to the person's physical constitution. In particular, the brown rice is germinated until the buds are out and albumen almost

disappears, except for the seedcase and the seed coat, thereby retaining minerals and dietary fiber. As a result, the dietary fiber extracted from the brown rice can be used to prevent and cure constipation and geriatric diseases. Seeds of plants change during their germination, and in particular, during the biological changes of brown rice, various nutrients contained in the brown rice are protected by phytic acid. Phytic acid is an organic compound contained only in the soil and plants. Although phytic acid may interfere with metabolism related to digestion and absorption in the human body (calcium metabolism disease), the germinated brown rice creates no interference with the metabolism (i.e., there is no need to protect seeds), thereby creating no interference with the absorption of nutrition. When the brown rice is germinated, since there is no need to protect various nutrients in the seeds, the phytic acid is decomposed by the action of a phytase into phosphorus and inositol, thereby solving problems related to digestion and absorption. Therefore, the germinated brown rice can be widely used as weaning food.

[Brief Description of the Drawings]

FIG. 1 is a flowchart of a brown rice germination method in accordance with the present invention;

FIG. 2A is a cross-sectional view showing a step of selecting rice grains in full maturity of the present invention;

FIG. 2B is a perspective view of a stirrer used in the step of selecting rice grains in full maturity of the present invention;

FIGS. 3A and 3B are cross-sectional views showing a germination step in accordance with the present invention; and

FIGS. 4A, 4B and 4C are views showing a temperature maintaining apparatus used to germinate a large amount of brown rice in accordance with the present invention.

<Description of Major Reference Numerals>

10: Wire net 20: Water bath

A: Step of selecting rice grain in full maturity

B: Step of polishing rice by pounding

C: Germination step

[Detailed Description of the Invention]

[Object of the Invention]

[Technical Field and Background]

The present invention relates to a brown rice germination method, and more particularly, to a brown rice germination method capable of effectively germinating brown rice having various nutrients and a large amount of dietary fiber in an undecayed state, enabling convenient cooking of the brown rice with a smooth and sweet flavor, and selecting and taking brown rice germinated to various levels. In addition, it is possible to germinate the brown rice until only dietary fiber remains in order to use the extracted dietary fiber in preventing and curing geriatric diseases.

Much research shows that instant foods or a meat-oriented diet accelerates acidosis of blood, causing geriatric diseases. The American Institute for Cancer Research (AICR) and the Australian Cancer Research Foundation (ACRF) advise the whole world to reduce ingestion of animal fat, carry out a grain and vegetable-oriented

dietary life, and consume just 10% of dietary calories from animal products to thereby reduce the chance of cancer by more than 50%. The advice is on the basis of the analysis of about 4500 papers published by great scholars in the field of cancer over three and half years. Articles related to the papers advise improvements in dietary life and consumption of brown rice, wheat, bread, vegetables, fruits, beans, and so on, in order to prevent cancer.

The reason for the advice related to the consumption of grains and vegetables is to consume more dietary fiber, which may be insufficiently consumed due to a meat-based diet.

Generally, brown rice contains vegetable fiber, various enzymes, and a large amount of inorganic nutrients such as minerals to increase resistance against diseases. Brown rice also prevents acidosis of blood, and makes alkaline blood, thereby preventing aging and strengthening intestinal functionality. The US Senate McGovern Report discloses that dietary fiber contained in brown rice is very effective in the above respects.

However, in spite of the excellent properties of brown rice, many people live on white rice, the inner seedcase of which is peeled off together with its dietary fiber. Many people do not know that dietary fiber absorbs and excretes various agricultural chemicals in the intestines, and have a preconception that agricultural chemicals remain less on white rice than on brown rice. In addition, it is difficult to cook brown rice in an electric rice cooker, and it is difficult to easily chew the brown rice due to its rough surface.

If the above problems are solved, the brown rice could be consumed without symptoms of rejection, and its ripple effect may be remarkable.

In addition, the World Health Organization (WHO) advises the daily intake of dietary fiber for an adult as 8g, and the Japanese Ministry of Health and Welfare advises 15 - 20g. However, since the daily intake can be accomplished by maintaining a fully grain and vegetable-oriented dietary life, a technology that can separate and extract only the dietary fiber from food is required.

A method of extracting dietary fiber from tangerines and vegetables has been developed in Germany. In addition, Otsuka Pharmacy in Japan manufactures a fiber drink called "Fivemini", which has been put on the market in Korea. However, these products contain water-soluble dietary fiber having low efficiency, and the content is too low, i.e. 0.5g per bottle. Therefore, a method for effectively extracting dietary fiber from food is still required.

[Summary of the Invention]

The present invention is created on the basis of the fact that energy in the seed is maximally activated during germination, and residual aqueous agricultural chemicals can be sufficiently diluted due to the natural purification of plant germination, since the seed contains the most highly concentrated nutrients in a plant.

In order to solve the problems, it is an object of the present invention to provide a brown rice germination method capable of effectively germinating brown rice having various nutrients and a large amount of dietary fiber in an undecayed state, maximizing nutrients and removing residual agricultural chemicals due to the natural purification during germination, enabling convenient cooking of the brown rice with a smooth and sweet flavor, and selecting and taking brown rice germinated to various levels.

It is another object of the present invention to provide a brown rice germination method capable of germinating the brown rice until only the dietary fiber remains, in order to use the extracted dietary fiber and thereby prevent and cure geriatric diseases.

In order to accomplish the above objects, the present invention is directed to a brown rice germination method including: inserting unhulled rice into saline solution and selecting unhulled rice showing strong germination; pounding the selected unhulled rice to produce brown rice; and a germination step of repeating an underwater germination step of accommodating brown rice in a wire net and inserting the wire bet in the water for a certain time, and an air germination step of pulling up the wire net over the water level by a predetermined distance.

[Detailed Description of the Invention]

Hereinafter, a brown rice germination method in accordance with a first exemplary embodiment of the present invention will be described in detail with reference to the accompanying drawings.

As shown in FIG. 1, a brown rice germination method in accordance with a first exemplary embodiment of the present invention includes a selection step A of inserting unhulled rice into a saline solution and selecting unhulled rice showing strong germination; a pounding step B of pounding the selected unhulled rice to produce brown rice; and a germination step C of repeating an underwater germination step of accommodating brown rice in a wire net and inserting the wire net in the water for a certain time, and an air germination step of pulling up the wire net over the water level by a predetermined distance.

FIG. 2A is a cross-sectional view showing step A of selecting rice grains in full maturity, i.e., showing strong germination. Step A is a step of inserting unhulled rice into a 70 - 100% saline solution and stirring the unhulled rice to take the unhulled rice floated on the saline solution out from the saline solution, thereby selecting the rice grain in full maturity.

The reason for selecting the rice grain in full maturity is that unripe rice grains may be readily decayed, rather than germinated.

FIG. 2B is a perspective view of a stirrer for stirring a saline solution. When a large amount of brown rice is processed, a separate device for automatically stirring the saline solution may be employed.

The selected rice grain in full maturity passes through a general pounding step B to become brown rice.

FIGS. 3A and 3B are cross-sectional views showing a germination step C in accordance with the present invention. The germination step C includes a primary underwater germination sub-step of inserting an appropriate amount of brown rice into a wire net 10, dipping the brown rice in the wire net 10 into a water bath 20 containing 12 - 18°C water or yellow soil settled water for 6 - 10 hours, and immersing the brown rice in the water or the yellow soil settled water for 1 - 8 hours in a state that the water is gradually heated to 20 - 32°C; an air germination sub-step of pulling the wire net 10 over the water more than 1cm, and covering the brown rice with a wet cloth for 2 - 5 hours after the primary germination sub-step; a sub-step of repeating an underwater germination sub-step of immersing the brown rice in 20°C water or the yellow soil settled water for 8 - 24 hours, and the air germination sub-step until germination with bubbles is observed; and a sub-step of repeating the underwater germination sub-step

and the air germination sub-step until the brown rice is germinated to a certain level in a state that the water and the air are heated to 26 - 32°C.

It will be appreciated that harmful materials such as residual agricultural chemicals are neutralized or discharged due to the natural purification of the brown rice when muddiness of the water or the yellow soil settled water in the water bath 20 is observed during the underwater germination sub-step. Much research shows that plants detoxify and nutrients are maximized during their germination. In particular, Max Planck Institute for Foods in Germany announced that activity of various nutrients is maximized in brown rice during germination.

In addition, the seed coat of the brown rice is softened during the repeated underwater and air germination sub-steps. As a result, it is possible to provide brown rice foods with a glutinous, smooth and sweet flavor, even though the brown rice is cooked in the same way as the white rice.

When brown rice is contained in the wire net 10 at a thickness of more than 5cm, an internal temperature of the brown rice may be excessively increased during germination. However, in order to germinate a large amount of brown rice, an internal temperature of the wire net 10 should be evenly maintained.

FIGS. 4A, 4B and 4C are views showing a temperature maintaining apparatus used to germinate a large amount of brown rice in accordance with the present invention. As shown, the apparatus includes a detection sensor 30 for sensing an internal temperature of brown rice, and temperature control means 40 for blowing cold air to evenly maintain the internal temperature of the brown rice on the basis of the detected temperature of the detection sensor 30.

The temperature control means 40 includes an air line 41 connected to the

bottom of the wire net 10, a control valve 42 connected to the air line 41, and a temperature regulator 43 for controlling the control valve in response to a detection signal from the detection sensor 30.

The temperature maintaining apparatus shown in FIGS. 4A, 4B and 4C is illustrated for an illustrative purpose only, and various apparatuses may be employed.

Brown rice germinated by the brown rice germination method in accordance with the present invention has different effects according to their germination levels.

Specifically, brown rice with a bud germinated to less than 1mm can be appropriately provided to a person who finds it hard to gain weight, since it has just begun germination and has various nutrients maximized by the natural purification and germination. Since such a person generally has low activity of digestive enzymes, and bacteria cannot grow in the intestines very successfully, it is possible to improve physical constitution by taking the brown rice just after germination.

In addition, even though brown rice with a bud germinated to approximately 1.5 - 2.5mm has partially broken down nutrients, because it has dietary fiber, minerals, proteins, and a vitamin B group which are increased, it can be appropriately provided to an overweight person.

Table 1 shows element analysis results of brown rice with a bud germinated to 2.5mm and white rice provided from Korean Food Research Institute.

[Table 1]

	White rice	Germinated brown rice
Ash content (%)	0.34	1.34
Crude fat (%)	1.10(Acidic decomposition)	2.87(Acidic decomposition)
Crude protein (%)	7.07 (Nitrogen coefficient 5.95)	8.06 (Nitrogen coefficient 5.95)
Carbohydrate (%)	81.61	78.70
Calories (kcal)	364.62	372.87

Dietary fiber (%)	0.25	1.28
Phosphor (mg/100g)	77.25	255.61
Calcium (mg/100g)	6.61	12.71
Iron (mg/100g)	1.25	1.75
Sodium (%)	0.021	0.023
Vitamin B1 (mg/100g)	0.06 (HPLC method)	0.2 (HPLC method)
Vitamin B2 (mg/100g)	0.002 (HPLC method)	0.03 (HPLC method)

As can be seen from Table 1, while the brown rice with a bud germinated to 2.5mm has substantially the same calories as the white rice, the content of dietary fiber, calcium, vitamins, and minerals is remarkably high. In particular, a high content of vitamins B1 and B2 means that there is no problem in terms of the nutrients, despite a vegetarian diet.

Meanwhile, the brown rice with a bud germinated to approximately 3 - 4mm with roots newly formed has low nutrients and minerals, its main element (i.e., the albumen) is almost gone, and there remain non-aqueous minerals, vitamins, and dietary fiber which are resistant to digestive enzymes and heat. Brown rice food, in which the germinated brown rice is milled into powder by a mixer, is a virtually perfect dietary fiber food, enabling people to readily consume the daily dietary fiber intake for an adult recommended by the WHO and the Japanese Ministry of Health and Welfare.

The brown rice with a bud germinated to 3 - 4mm by the brown rice germination method in accordance with the present invention can readily obtain a large amount of dietary fiber in comparison to the Max Planck method or the Otsuka method of extracting dietary fiber from tangerines.

However, in the case of general water being used to germinate brown rice in the water tank 10, when the brown rice is germinated until a bud is out more than 3mm, the brown rice may be decayed and roots may not grow.

In order to solve the problem, the inventor employs a method of filling 80 - 90g of yellow soil into 100 liters of water and stirring the yellow soil, filling the water bath 20 with clean water obtained after settling the yellow soil through 24 hours settlement, and germinating brown rice. As a result, it was observed that roots grow well even though bud may have germinated to more than 4mm.

The yellow soil settled water disclosed herein means clean water obtained after settling the yellow soil.

It is well known that yellow soil has functionality remarkably higher than that of the general tap water. The reason for using yellow soil in a rice seedbed is similar to the above. As a result of obtaining yellow soil settled water using yellow soil collected from Khotan in Uighur Autonomous Region and measuring its functionality, general water has a maximum functionality of 6.5, and the yellow soil settled water has a maximum functionality of 20.9. (Khotan is a region in which peoples use the yellow soil settled water as drinking water due to climate and geographical influences.)

As described above, when the brown rice is fully germinated, the high functionality of the yellow soil prevents decay of the brown rice and accelerates growth thereof.

The brown rice germinated as described above can be provided as commercial foods in powder or juice form. Since uncooked starch, milled by a mixer, is formed of amylose and amylo vaccine clotted to each other, digestive fluid cannot sufficiently act to digest the starch, it is possible to obtain a good effect in terms of diet and constipation.

[Effects of the Invention]

As can be seen from the foregoing, it is possible to provide a brown rice

germination method capable of effectively and uniformly germinating brown rice having various nutrients and a large amount of dietary fiber in an undecayed state, maximizing nutrients and removing residual agricultural chemicals, enabling convenient cooking of the brown rice with a smooth and sweet flavor, and selecting and consuming brown rice germinated to various levels according to a person's physical constitution. In particular, it is possible to provide a brown rice germination method capable of germinating the brown rice until only dietary fiber remains, in order to use the extracted dietary fiber, thereby preventing and curing geriatric diseases.